

Capasso 65-104-1-19-28-7-34-13

IN THE CLAIMS:1. - 7. *cancelled*

8. (*currently amended*) A unipolar quantum cascade (QC) laser device particularly configured to provide a measurement of intersubband electroluminescence (ISB-EL), said QC laser device comprising the following layers and regions formed on a semiconductor substrate:

a core region including a QC active region which comprises a multiplicity of unipolar radiative transition regions interleaved with a multiplicity of unipolar injection/relaxation regions.

upper and lower cladding regions bounding said core region, at least said upper cladding region and said core region having the shape of a longitudinal stripe having sidewalls and a top surface, said lower cladding region disposed to cover a top major surface of said semiconductor substrate

an active region formed as a ridge waveguide structure on a top major surface of a semiconductor substrate;

an insulating layer disposed to cover the extent of said active region;

a top metal contact layer disposed over the stripe-shaped upper cladding region

a bottom metal contact layer disposed to overlay a bottom major surface of said semiconductor substrate; and

a pair of laser facets formed as the terminations of said stripe-shaped core region ridge waveguide structure, said facets formed to be orthogonal to the extent of said ridge waveguide structure said longitudinal stripe-shaped core region such that upon the application of a bias current between said top and bottom metal contact layers, laser emission will be created in a longitudinal direction along said ridge waveguide structure QC active region and exit at said pair of laser facets (only if not coated)

CHARACTERIZED IN THAT

the unipolar quantum cascade laser structure is formed to include a longitudinal cleave through the ridge waveguide structure stripe-shaped upper cladding and core regions so as to expose the QC active region and a longitudinal facet of said semiconductor substrate and waveguide, and the laser facets are formed to include a

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highly reflective surface coating, such that intersubband electroluminescence (ISB-EL) will exit from the exposed QC active and region.

9. (*currently amended*) The device of claim 8 wherein the ~~insulator layer upper and lower cladding regions each~~ comprises a layer of SiN.

10. (*original*) The device of claim 8 wherein the top and bottom metal contact layers comprise Ti/Pt/Au.

11. (*currently amended*) The device of claim 8 wherein the pair of laser facets comprise coatings include including an inner layer of SiO₂ and an outer layer of Ti/Au and Ge/Au/Ag/Au, respectively.